Prototype for IETF Interactive Audio Codec

`draft-valin-codec-prototype-01.txt`

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IETF 78 – codec WG

Introduction

- Lots of technical work since last meeting
- This is a prototype, not a complete codec
  - No decision is final
- Aligned on `draft-ietf-codec-requirements-00`
- Hybrid codec based on a combination of the SILK and CELT codecs
  - SILK: speech frequencies below 8 kHz
  - CELT: music and speech frequencies above 8 kHz
  - Other codecs **not** excluded

Work Since Last Meeting

- SILK pre-integration work
  - Conversion to use the CELT range coder
  - Support for 10 ms frames
  - Resampling for 32 kHz and 48 kHz sampling rates
- CELT pre-integration work
  - Optimisation of 20 ms frames, dynamic switching
  - Adjustable frequency range (low and high)
  - Tuning, quality improvements
- Actual integration work

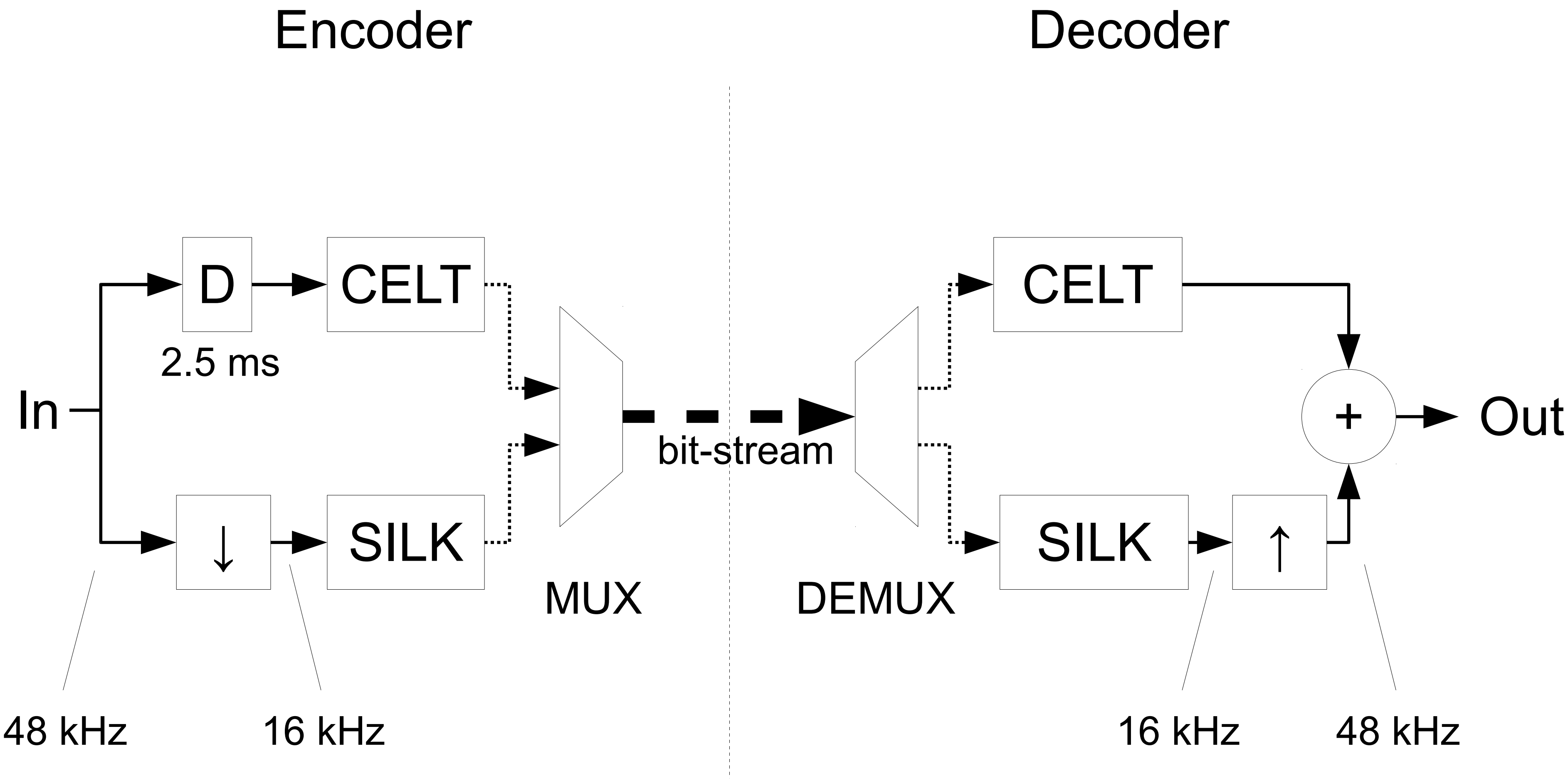
Where is the Secret Source Code?

- All development is publicly accessible with git
- Main CELT repository
  - git://git.xiph.org/celt.git
- Temporary (unofficial) SILK repository
  - git://git.xiph.org/users/jm/silk.git
- Jean-Marc's version of the hybrid codec
  - git://git.xiph.org/users/jm/ietfcodec.git

Characteristics

- Sampling rates: 8, 12, 16, 32, 48 kHz
- Audio bandwidth: 4, 6, 8, 16, 20 kHz
    - Narrowband, medium band, wideband, superwideband, fullband
- Bitrates: ~6 – 128 kb/s per channel
- Frame sizes: 2.5, 5, 10, 20, 40, 60 ms
- Look-ahead: 2.5 – 5.2 ms
- Audio contents: speech, music

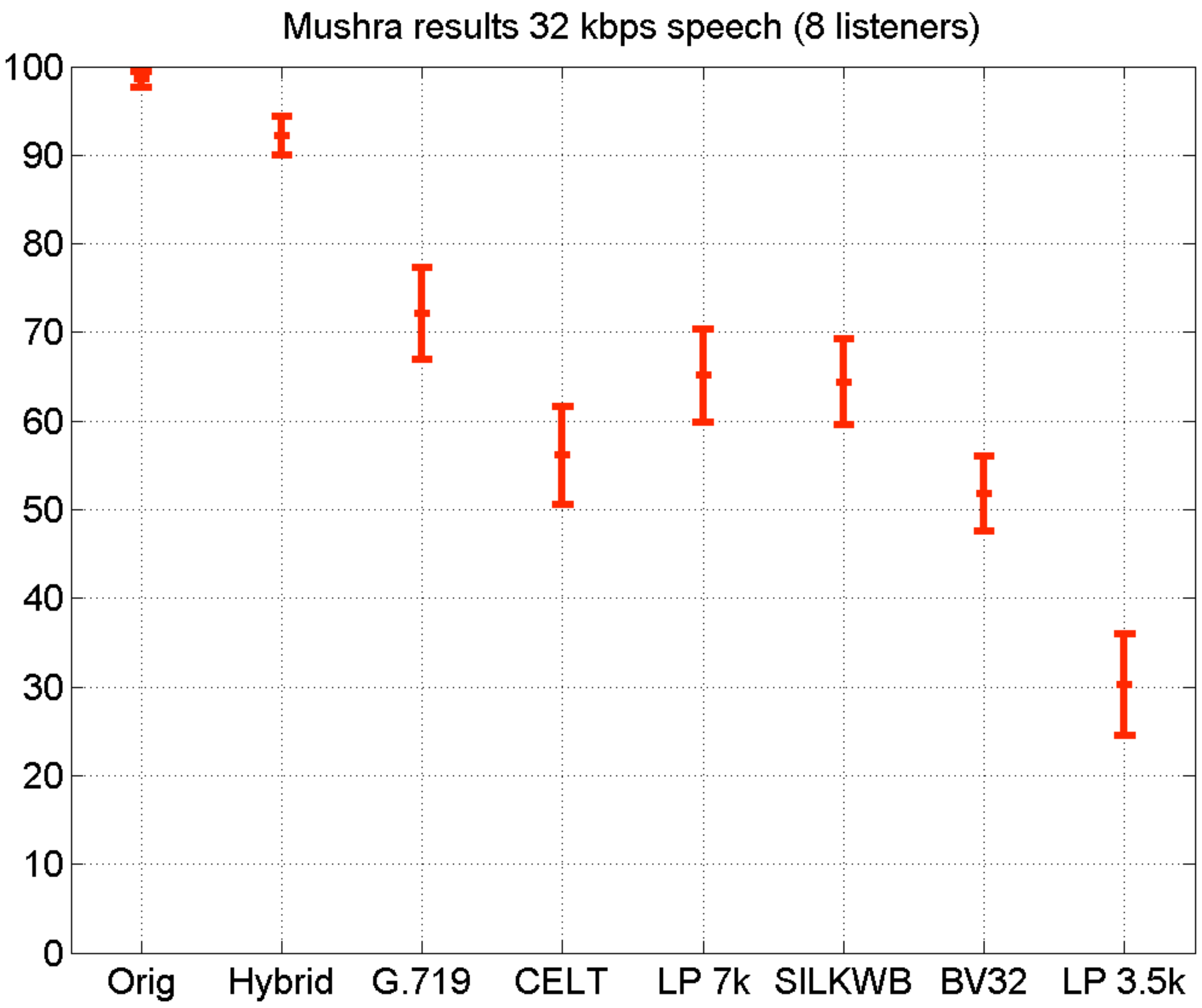
Overview


Encoder
Decoder
In
D
2.5 ms
CELT
↓
SILK
MUX
bit-stream
DEMUX
CELT
SILK
↑
+
Out
48 kHz
16 kHz
16 kHz
48 kHz

Operating Modes

- SILK-only
  - wideband: 10, 20, 40, 60 ms
  - medium band: 10, 20, 40, 60 ms
  - narrowband: 10, 20, 40, 60 ms
- SILK+CELT (hybrid)
  - fullband: 10, 20 ms
  - superwideband: 10, 20 ms
- CELT-only
  - fullband: 2.5, 5, 10, 20 ms
  - superwideband: 2.5, 5, 10, 20 ms
  - wideband: 2.5, 5, 10, 20 ms
  - narrowband: 2.5, 5, 10, 20 ms

Listening Test



Conclusion

- Prototype codec for speech and music
- Designed to match `draft-ietf-codec-requirements-00`
- Future integration work
  - Automatic mode selection/switching
  - Better hybrid mode bit allocation
  - Closer PLC integration
  - Lots of tuning
  - More code sharing